SINGAPORE MATH STRATEGIES FOR GIFTED STUDENTS

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METROLINA REGIONAL SCHOLARS ACADEMY

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- Charter school for highly gifted students located in Charlotte
- Serve 368 students in grades K though 8
- Students can be eligible for the lottery based if their full scale IQ score is at least 2 standard deviations above the mean
- We serve some students who are twice exceptional and have IEPs or 504s
- We have developed an accelerated curriculum in Language Arts, Social Studies, Mathematics, and Science that goes above and beyond the state required standards
- Students have 10 enrichment periods each week that consist of two classes each of Chinese, Spanish, Music, Art, and Physical Education

OUR SCHOOL'S JOURNEY TO SELECTING SINGAPORE MATH

- Everyday Mathematics curriculum used for many years for grades K through 4
  - Student retention of material was low due to the spiral curriculum format
  - Focus on higher level thinking skills often replaced solid foundational skill development
- Sought an academically rigorous curriculum that would help students think critically and creatively about mathematics while providing enough practice to allow mastery of skill
- Committee reviewed several different curriculum options and determined that Singapore Math was the best fit for our students

SINGAPORE MATH APPROACH

- Revolves around several key number sense strategies
- Relies on model drawing to solve word problems
- Mental math which will teach students to solve problems in their heads
- Strategies taught are layered upon one another
- Teaches students to understand math in stages
- Aligned to Common Core objectives
- Concrete-Pictorial-Abstract Progression
  - Instructional strategies build understanding through activities that move students in a sequence from the concrete (manipulatives) to the pictorial (visual models) and then to the abstract (symbolic) level

WHY IS SINGAPORE MATH APPROPRIATE FOR GIFTED KIDS?

Depth and Acceleration- The curriculum covers fewer topics per grade level than most traditional curricula, but it covers them in greater depth, which helps students develop mathematical thinking. This deep investigation provides students a foundation that leads to significantly more complexity and acceleration as students progress through the program.

Communication as a vehicle for learning The curriculum emphasizes precise mathematical communication. The act of describing mathematical operations verbally and in writing can be complex for gifted learners, who frequently make intuitive leaps when solving problems. The process of communicating their work opens up new levels of understanding and prepares gifted learners to share their thinking with others.

Visual learning Singapore Math is a highly visual program, with an emphasis on model-drawing to solve problems as an interim step to mental visualization. This benefits many visual-spatial gifted children.

WHAT WE HAVE LEARNED ABOUT OUR STUDENTS THIS YEAR

- Strong ability to apply algorithms, but very little conceptual understanding
- Place value unit took FOREVER at every grade level – basis for everything in math!
- Model drawing is hard, even for gifted kids
- Model drawing allows even the struggling learners to get started on a problem
- Our students were frustrated with learning many different methods- they just want to get to the answer

OTHER CHALLENGES

- Parents needed educational on the strategies used by Singapore Math
- Implemented K through 4 – Older students had some catching up to do to use the new strategies especially number bonds and mental math
- Dependent on manipulatives that teachers had to create
- Professional development for teachers is not readily available in Charlotte and is quite expensive

THE IMPORTANCE OF PLACE VALUE

- Traditional Understanding of Place Value might include:

  What digit is in the thousands place? 124,675

  What place is there an 8? 380,456

- In Singapore Math a student would understand that in a number like 380,456 there are 380,456 ones, 38,045 tens, 3,804 hundreds, 380, thousands, 38 ten thousands, 3 hundred thousands.

  This understanding is essential to understand the standard algorithms of addition, subtraction, multiplication and division.

OUR STUDENTS IN ACTION
PLACE VALUE

OUR STUDENTS IN ACTION SUBTRACTION

LET'S TRY SOME PROBLEMS

Place Value (4.NBT.1)

Using the place value model, add and subtract the following:

1. 1,816 + 1,238 =

thousands	hundreds	tens	ones

2. 1,006 – 897 =

thousands	hundreds	tens	ones

Handouts and manipulatives are on the tables.

Please grab a partner and try some place value problems.

VISUAL MODELS FOR MULTIPLICATION

Traditional algorithm

$$\begin{array}{r} 34 \\ \underline{\times\ 15} \end{array}$$

Students thin they are multiplying 5 times 4 and then 5 times 3, then 1 times 4 and 1 times 3. They are just following the steps without understanding what it is they are actually doing.

VISUAL MODEL OF DIVISION

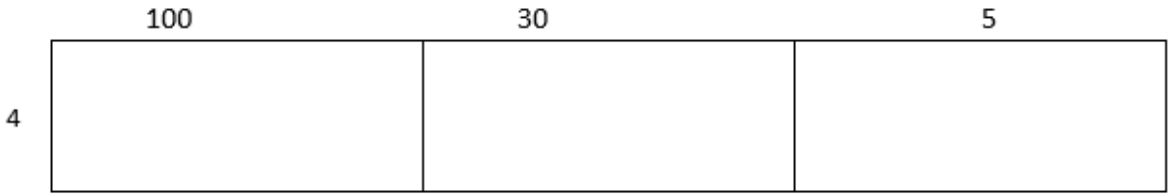
In division the same is true for the standard algorithm.

In a problem like 5,208 ÷ 4 =

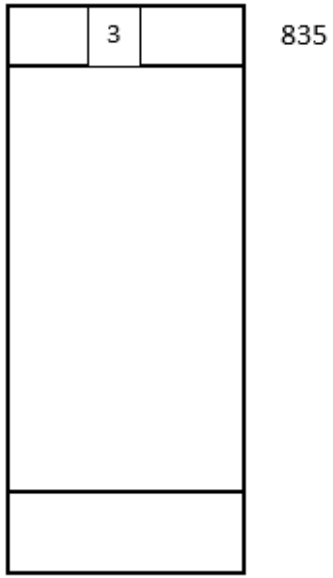
Students think that they are dividing 5 by 4, then 2 by 4, then 20 by 4, then 8 by 4.

VISUAL MODELS FOR MULTIPLICATION AND DIVISION

6. 135 x 4 =



7. 835 ÷ 3 =



WORD PROBLEMS

Marshall Cavendish Education

Fill in the blanks.

Mark gave $\frac{2}{6}$ of a pie to Lala and $\frac{3}{4}$ of the remainder to Ben.

a) What fraction of the pie did Ben receive?

b) What fraction of the pie did Mark have left?

Remainder: $1 - \frac{2}{6} = \frac{4}{6}$

$\frac{3}{4}$ of $\frac{4}{6} = \frac{3}{4} \times \frac{4}{6}$

$= \frac{3}{6}$

$= \frac{1}{2}$

Many steps
Easy to make mistakes
No visual representation

MODEL DRAWING

- Mr Cohen earns $2935 a month, if he spends $1780 each month and saves the rest, how much will he save in 6 months?

Mr. Cohen saved _____ in six months.

MODEL DRAWING

Lucy spent 3/5 of her money on a purse. She spent the remainder on 3 T-shirts which cost $4 each. How much did the purse cost?

Lucy's purse cost $_____.

MODEL DRAWING PROBLEMS

3. Shawna had a roll of ribbon. She used 475 cm of ribbon to make flowers. Then, she made 10 bows. She used 75 cm of ribbon for each bow and had 45 cm of ribbon left. Find the length of the original roll of ribbon. (4.NBT.5, 4.OA.3)

4. There are 36 students in a class. 2/3 of them are girls. ¼ of the girls wear glasses. How many girls wear glasses (4.NF.4c)?

5. Cooper wrote three pages of his history report on Tuesday. He wrote 2/3 of the remainder on Wednesday. He still needs to write 2 more pages. What is the total number of pages in Cooper's report (5.NF.6)?

THANK YOU FOR COMING!

We have a table set up in the exhibitor's hall. We would love to connect with other teachers in the state. Please stop by and say hello!

Questions?